



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,537	03/04/2002	Herbert Thanner	66376-279-7	1049

25269 7590 10/20/2005

DYKEMA GOSSETT PLLC  
FRANKLIN SQUARE, THIRD FLOOR WEST  
1300 I STREET, NW  
WASHINGTON, DC 20005

EXAMINER
----------

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT	PAPER NUMBER
----------	--------------

1751

DATE MAILED: 10/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/086,537

Applicant(s)

THANNER ET AL.

Examiner

Kallambella Vijayakumar

Art Unit

1751

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 4-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-23 is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

Claims 1-2 and 4-23 are pending with the application. Claims 1 and 20 were amended.

Applicant's arguments filed 07/28/2005 have been fully considered but they are not persuasive.

The applicants argue that Sakharov et al and Phillipot et al teach the crystal cuts with  $-90$  to  $+90$ , but they do not teach using respective crystal cuts with low values of electro mechanical coupling coefficient ( $K_e$ ).

The crystals and the crystal cuts disclosed by the prior arts inherently possess the instant claimed low  $K_e$  values and the frequency spacing, and the instant claims would not be patentably distinct from the prior art disclosure.

"Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990)

### *Claim Rejections - 35 USC § 102*

---

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-2, 4-11 and 15-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakharov et al, (IEEE Frequency Control Symposium, 1992, Pages 713-723).

Sakharov et al disclose monolithic filters comprising piezoelectric single crystal resonators of Langasite (LGS) having a cut with an excitable fundamental frequency and operating in a thickness shear mode with an electromechanical coupling coefficient ( $K_e$ ) ranging from 2.5% to 0% for the crystal cuts between  $-60$  to  $-90$  (Pg-713: Abstract; Pg-714, LGS-Crystal Structure, Pg 715: Piezo Prop; Pg717, Fig-6). Sakharov et al further disclose an operational frequency range of 5 MHz to 18.5 MHz for the Y-cut

Art Unit: 1751

single crystal oscillator with an accuracy up to 5', frequency constant to be  $\pm 5$  kHz mm for a crystal cut, and a low variance of the frequency constant as a function of temperature between -200C to +100C (Pg-717, Col-1 and Fig-6, Pg-718, Freq. vs temp characteristics, Figs-7-8; Pg-722: Conclusion). The Sakharov's data on Ke in Fig-6 (Pg-717) further overlaps with the applicant's values that meet the limitations of instant claims. A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including non-preferred embodiments. Merck & Co. v. Biocraft Laboratories, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cl.), cert. denied, 493 U.S. 975 (1989). With regard to the treatment to the crystal in claim-7, the claims are drawn to the piezoelectric single crystal element/resonator itself. All the limitations of the instant claims are met.

The reference is anticipatory.

2. Claims 1-2, 8-14 and 18 are rejected under 35 U.S.C. 102 (b) as being anticipated by Philippot et al (J. Crystal Growth 1993, 130, PP 195-200).

Philippot et al discloses a GaPO<sub>4</sub> piezoelectric single crystal element resonator having low shear mode with an electromechanical coupling coefficient (Ke) ranging from about 1% to 0% for the crystal cuts between -65 to -90 (Pg 195, Abstract, Pg 201, Section 3.4; Pg, 203, Fig-16). With regard to the claim-8, the prior art show little thermal variations of resonance frequencies with temperature (Pg-205, Fig 20, 22; Pg-206, Fig. 22-24, Pg-207, Fig 25). All the limitations of the instant claims are met.

The reference is anticipatory.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1751

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 19 rejected under 35 U.S.C. 103(a) as being unpatentable over Sakharov et al, (IEEE Frequency Control Symposium, 1992, Pages 713-723) in view of Kochurikhin et al (J. Crystal Growth, 1997, 1 81, pp 452-454).

The disclosure by Sakharov et al on monolithic filters comprising cut LGS piezoelectric single crystal resonators as set forth in Rejection-1 under 35 USC 102(b) is herein incorporated.

Sakharov et al do not teach a piezoelectric single crystal element of cut strontium-gallium-germanate per the claim. However, the prior art disclosure is suggestive of a strontium-gallium-germanate piezoelectric element (Pg 722, Conclusion).

In the analogous art, Kochurikhin et al disclose the growth and piezoelectric properties of strontium-gallium-germanate (SGG), wherein the piezoelectric properties of SGG surpassed that for LSG (Pg 454, Co1-1, Para; Co1-2, Tab1e-2).

It would have been obvious to a person of ordinary skill in the art to combine the prior art teachings to optionally choose SGG as functional equivalent of LSG, and further optimize the cuts for the piezoelectric crystal to benefit from a piezoelectric element with surpassed wide range of applications with reasonable expectation of success, because the prior art in combination suggest the claimed piezoelectric element.

#### **Allowable Subject Matter**

Claims 20-23 are allowed over the prior art of record that neither teaches nor fairly suggest a method of manufacturing a single crystal resonator with a  $K_e$  lying between 0.05-3% and having a frequency spacing per the applicants.

Art Unit: 1751

**Conclusion**

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8-5.30 Mon-Thu, 8-4.30 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMV  
October 15, 2005.

  
**Mark Kopeck**  
**Primary Examiner**